



Modern Mathematics Workshop 2018

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SPEAKER TITLES/ABSTRACTS

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Bio:

Annie Raymond is an assistant professor at the University of Massachusetts in Amherst. Originally from Montreal, she studied math and music at MIT as an undergrad before pursuing a Ph.D. in mathematics at the Technische Universitaet in Berlin and a postdoc at the University of Washington. At any given moment, you will most likely find her thinking about extremal graph theory and sums of squares---perhaps while riding her bicycle or playing the piano---or reflecting on education in prisons, on how to increase diversity in STEM and on how to bake the perfect sourdough.

Abstract:

“Symmetry and Graph Profiles”

We often think of graphs and of their global properties in a very visual way. This works fine for smaller graphs, but for most real-world applications, the underlying graphs are very large---sometimes so large that their data cannot fit on a computer. In that case, how can one understand such a graph and its global properties? One way is to think about it locally. Given a large graph G , create a vector recording the induced density in G of every small graph in some fixed finite list of graphs. We can think of this vector as the coordinates of G in the space of the smaller graphs. This way of thinking about large graphs immediately raises two questions. First, how are local and global properties related? In other words, given the coordinates of G , what are global properties of G ? Second, what is even possible locally? Say you want to create a graph with certain local distributions, can it be done? I am interested in the second question and, in this talk, I will explore its connections to extremal graph theory and symmetric sums of squares. This is joint work with Greg Blekherman, Mohit Singh and Rekha Thomas.